Status report & Plans ND Slicing using MSTs

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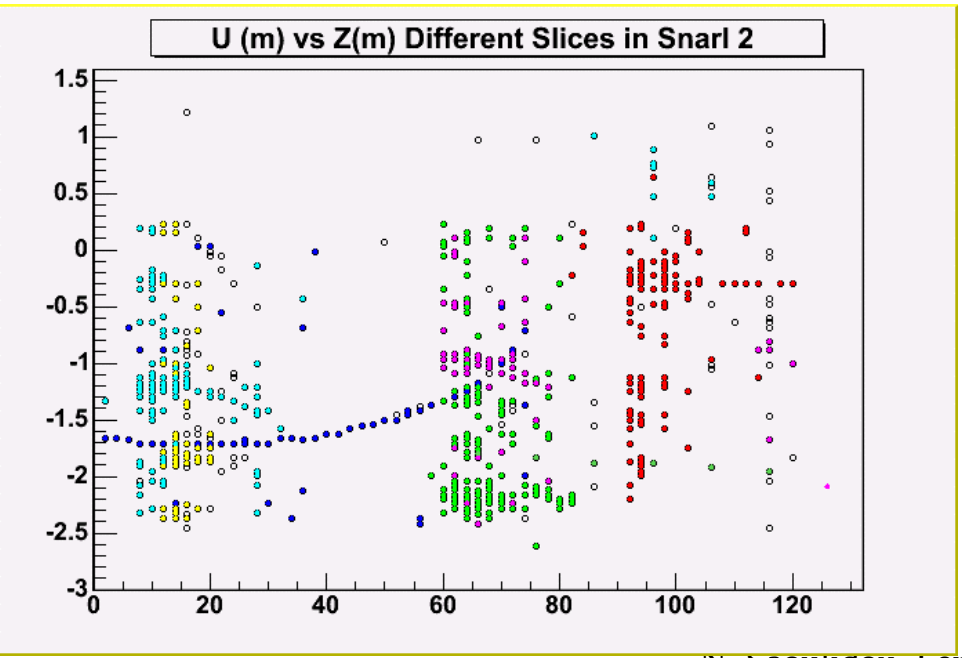
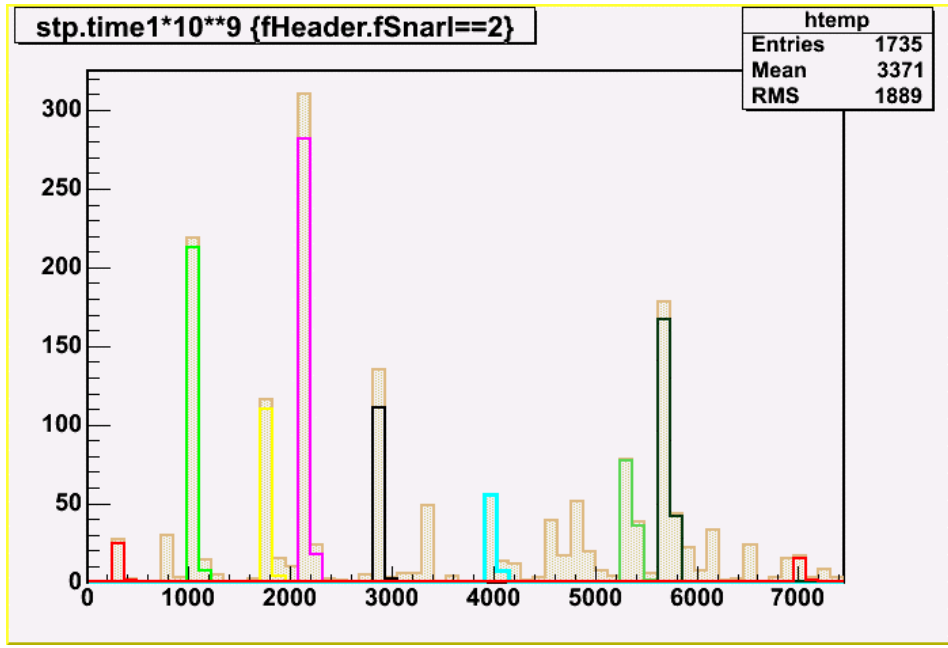
Outline

- Update on Changes since Colab. Mtg. & comparison with current SR code :
  - Slice purity & completeness
  - Track purity & completeness
  - Shower purity & completeness
- Plans (do what I haven't done since the previous reco meeting…)

MST in ND (Clustering in time & space)

- I have used a hybrid metric for constructing the length of the MST branch connecting two strips :
  - **time difference x c + a x length difference (in z) and I using a semi-random initial cut that is going to be tuned….**
  - **This method has just ONE parameter that needs to be tuned…**
  - **Ok I lied … it has 3 :**
    - **Minimum number of strips to form a slice**
    - **Minimum pulse height to consider the strip**
    - **Cut on the length of my TREE.**





Updates- changes since Colab. Mtg.

- Changed the minimum number of strips to form a slice (this is a global parameter of my code as well) from 10 to 5 after Tom O. discussed the implication of that the NC events
- Changed the Pulse height cut in order to consider a strip as member of a slice from 2 PEs to 0 PEs (I am not cutting anything).
- Changed the constant that Nathaniel uses in the MC to tune the light level from 1104 to 894 (!) as he suggested in the Colab. Mtg.
- Changed "a little" bit the way the time stamp of digits is used from the offline software for the ND (still experimenting)…
- Treat calorimeter and spectrometer strips in exactly the same way with my code.
- Run my code with all these changed and the SR code with the changed related with the "Minimum number of strips" and "Pulse height cut" changes and compare….
- **The comparison is MOSTLY based for the moment on truth helper quantities…I started looking at NC/CC efficiencies in more detail (Sue K. helped me A LOT in understanding the alignment between the different tress SR TH MC) but I am badly bitten by statistics! (I am able to run 200 overlaid events in the one day between the rebuilds of the development)**

Summary & Ongoing work

- This new slicing method is very promising, simple, flexible and easy to tune : it is just a selection of a metric and cut on branch length.
- It gives results as good as the SR…and it is really robust.
- It can be used to either strips or digits…BUT if we want to slice digits the "philosophy" of the current SR code has to slightly change:
  - After forming the digits we will have slices of digits (the daughter list of slices at this stage should be digits…)
  - Then from the sliced digits we form strips…The slices should now have strips, digits or both as daughter lists
- It is ready to be used now…(I have send my code to Jim) AND
  - I plan to do it a little bit better by replacing all these arrays that I am newing with stl vectors (within the next week)
  - Make my code a separate Algorithm that anybody can choose to run by setting a specific key value.
- I went back to using using charge weighted time and the results DID NOT change significantly.
- Next time I plan to have more detailed results on the various reconstructed quantities and on event selection efficiencies and biases (CC/NC)